# XYZ studies at BESIII

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**Summary.** — A review of few of the most recent results on XYZ studies at BESIII is reported. Thanks to its unique data sample of $5.1 fb^{-1}$ in the energy range between 3.8 and 4.6 GeV, BESIII can give a significant contribute in this field. We discuss some of the most recent results on $Z_c$ states and the first observation of $e^+e^- \leftarrow \omega\chi_{c0}$ at s = 4.23 and 4.26 GeV as well as the measurements of the cross-sections of $\omega\chi_{cj}$and $\eta J/\Psi$.

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## 1. – Introduction

The BESIII experiment is installed at the BEPCII double-ring electron-positron collider at the Institute of High Energy Physics (IHEP, Beijing, PRC), with a beam energy tunable from 1.0 to 2.3 GeV. The BESIII detector is a magnetic spectrometer composed by a helium gas based Main Drift Chamber (MDC), a plastic scintillator Time-Of-Flight (TOF) system, a CSI(Tl) ElectroMagnetic Calorimeter (EMC) and a muon detector (MUC) based on Resistive Plate Chambers, immersed in a 1.0 T magnetic field provided by a super-conducting solenoidal magnet. Further details can be found in Ref.[1].

In the last decade many unexpected states (named the XYZ states) were discovered mostly at B-factories in the charmonium spectrum, the so-called charmonium-like states. Their peculiar properties that do not fit the conventional charmonium paradigm, opening the door to various exotic hypotheses. This has produced a renewed strong interest in this field both from the experimental and the theoretical point of view. They are commonly distinguished in three main groups. The Y states are the vector states, X and Z are the charged ones. The Y(4260) was first observed by BaBar in the $e^+e \rightarrow \pi^+\pi J/\Psi$ cross section [**?**] and subsequently confirmed by [**?**] and Belle [**?**]. Its production in electron-positron annihilations determines its quantum numbers to be $J^{pc} = 1$ while the absence of a similar structure in open charm channels suggest that it is not a conventional charmonium. At BESIII, Y(4260) states can be produced directly.

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